User Manual Scion Series Brushless Speed Controllers

Firstly we would like to thank you for purchasing **RCMDIRECT.CO.UK**'s "Scion" series Electronic Speed Controller (ESC). These high power systems can be very dangerous, so we strongly suggest you read this manual carefully. As we have no control over the correct use, installation, application, or maintenance of our products we do not accept any liability any damages, losses or costs resulting from the inappropriate use of the product.

Features

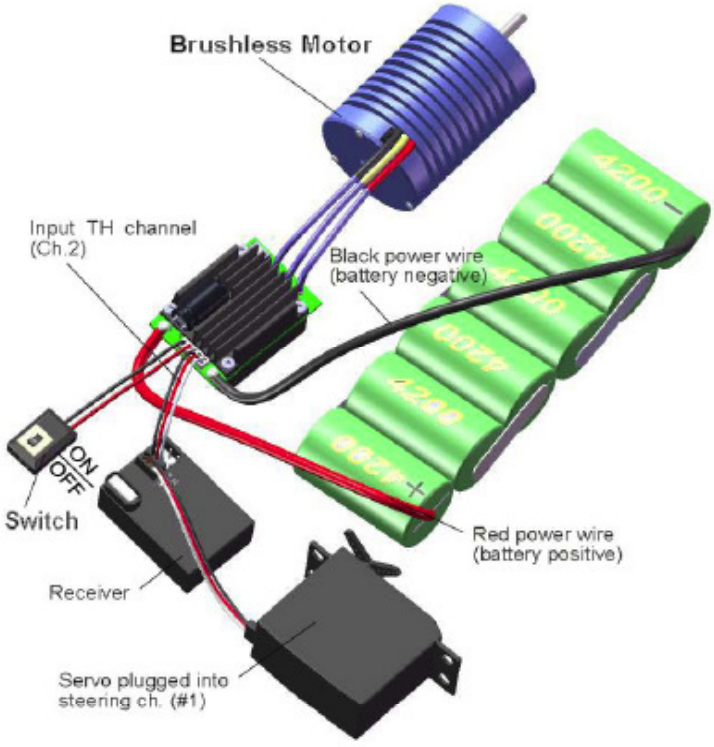
- The ESC is designed for RC cars, with excellent start-up, acceleration and linearity features.
- They are compatible with brushless motors.
- Top quality electronic components have been used to enhance the current endurance ability of the ESC.
- 2 running modes (Racing mode and Forward/Reverse mode)
- 4 steps of maximum reverse force adjustment.
- Proportional ABS brake function with 4 steps of maximum brake force adjustment, 8 steps of drag-brake force adjustment and 4 steps of initial brake force adjustment.
- 4 start modes (Also called "Punch") from "soft" to "very aggressive".
- Multiple protection features: Low voltage cut-off protection for lithium or nickel battery / Over-heat protection / Throttle signal loss protection / Motor jamming protection.
- 8 steps of timing adjustment.
- Waterproof and dustproof.
- Easily program with only one button and compatible with pocket-sized program card.

Specifications

Model	Scion-18A	Scion-25A	Scion-35A	Scion-60A
Cont. Current	18A	25A	35A	60A
Burst Current	50A	90A	190A	380A
Resistance	0.01 ohm	0.005 ohm	0.0015 ohm	0.0007 ohm
Suitable Car	1/18, 1/16 car			1/10 car
Suitable Brushless Motor	>12T		> 9T	> 5.5T
Battery	4-9 Cell Ni-xx (NiMh or NiCd) or 2-3 Cell Li-Po Note: For 7-9 Cell Ni-xx / 3 Cell Li-Poly: The fan provided needs to be replaced with a fan with is suitable for higher voltage.			
BEC Output	6V / 1A	6V / 1.5A		
Motor Type	Brushless Motor			
Dimension (mm)	31.5 x 24 x 15	31.5 x 27.5 x 16	31.5 x 27.5 x 24 (The height of fan is not included)	
Weight (without wires)	19g	23g	30g	32g

Wiring / Connections

Connect the ESC, motor, receiver, battery and servo according to the diagram on the right.
#A, #B and #C are connected with the motor wires.
The "SET" button is used for programming the ESC.
The control cable of the ESC (trio wires with black, red and white colour) is connected with the throttle channel of the receiver (Usually CH2).
The #A, #B, #C wires of the ESC can be connected with the motor wires freely (without any order). If the motor runs in the opposite direction, please swap any two wires.
"+" and "-" wires on the ESC are connected with the battery pack.
Note: You can use the transmitter to set the throttle channel to the "Reverse" direction, and then the motor will run in the opposite / reverse direction. Please calibrate the throttle range again after changing the direction of throttle channel.



User Manual Scion Series Brushless Speed Controllers

Throttle Range Setting (Throttle Range Calibration)

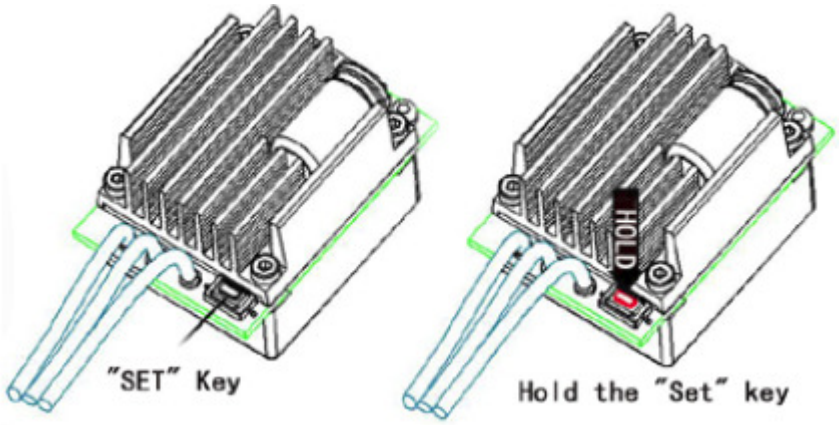
This calibration is required to be done when you are using / setting up the ESC for the first time; using or setting up a new transmitter; user requires changing the position of the throttle stick, ATV or EPA parameters, etc.

3 points need to be set, they are: Forward, Reverse and the Neutral point.

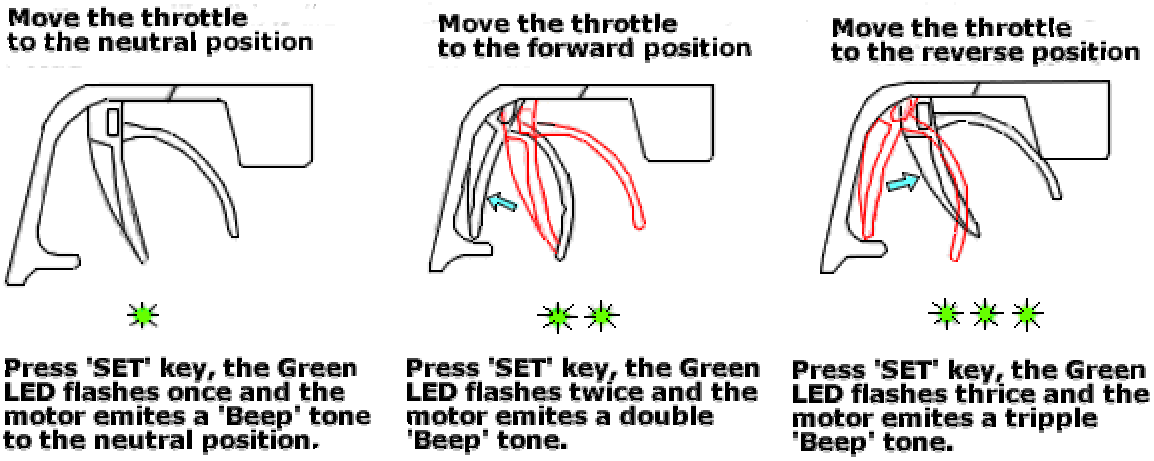
The following pictures show how to set the throttle range with a Futaba transmitter.

1. Switch off the ESC, turn on the transmitter, set the direction of throttle channel to ”REV”, set the “EPA/ATV” value of throttle channel to “100%”, and disable the “ABS” brake function of your transmitter.

2. Hold the “SET” key and then switch on the ESC, when the red LED begins to flash, release the key immediately.
If you don’t release the “SET” key after the red LED begins to flash, the ESC will enter the program mode, in such a case, please switch off the ESC and re-calibrate the throttle range again from step 1 to 3.



3. Set the 3 points according to the steps shown in the picture below:
- Neutral point
- End point of forward direction
- End point of reverse (backward) direction


Move the throttle to the neutral position
Press 'SET' key, the Green LED flashes once and the motor emites a 'Beep' tone to the neutral position.
Move the throttle to the forward position
Press 'SET' key, the Green LED flashes twice and the motor emites a double 'Beep' tone.
Move the throttle to the reverse position
Press 'SET' key, the Green LED flashes thrice and the motor emites a tripple 'Beep' tone.

4. When the process of calibration is finished, the motor can be started after 3 seconds.

LED Statuses in Normal Running Mode

- In normal use, when the throttle stick is in the neutral position, neither the red LED nor the green LED lights.
- The red LED lights when the car is runs forward or in reverse and it will flash quickly when the car is braking.
- The green LED lights when the throttle stick is moved to the top point (end point) of forward or reverse.

User Manual Scion Series Brushless Speed Controllers

Alert Tones

- Input voltage abnormal alert tone: The ESC begins to check the input voltage when power on, if it is out of the normal range, such an alert tone will be emitted: “beep-beep-, beep-beep-, beep-beep-” (There is 1 second time interval between every “beep-beep-” tone).
- Throttle signal abnormal alert tone: When the ESC can’t detect the normal throttle signal, such an alert tone will be emitted: “beep-, beep-, beep-” (There is 2 seconds time interval between every “beep-” tone).

Protection Function

- Low voltage cut-off protection: If the voltage of a lithium battery pack is lower than the threshold for 2 seconds, the ESC will cut of the output power. Please note that the ESC cannot be restarted if the voltage of each lithium cell is lower than 3.5V.
  For NiMh/NiCd battery packs, if the voltage of the whole NiMh/NiCd battery pack is higher than 9.0V but lower than 12V, it will be considered as a 3-cell lithium battery pack; if it is lower than 9.0V, it will be considered as a 2-cell lithium battery pack. For example, if the NiMh battery pack is 8.0V, and the threshold is set to 2.6V/Cell, so it will be considered as a 2 cell lithium battery pack, and the low-voltage cut-off threshold for this NiMh battery pack is 2.6 x 2=5.2V.
- Over-heat protection: When the temperature of the ESC is over 95 degrees Celsius for 5 seconds, the ESC will cut off the output power. You can disable the over-heat protection function for competition use.
- Throttle signal loss protection: The ESC will cut off the output power if the throttle signal is lost for 0.2 second.

Entering programming mode

- Turn off ESC
- Turn on transmitter
- Hold the “SET” key on the ESC till Red LED flashes
- To move from one programmable item to another - Hold “SET” key for 3 seconds
- To move from one programmable value to another within the same programmable item Press the “SET” key.

Programmable Item List (High-lighted values indicate default values)

Programmable Items	Programmable Value							
	1	2	3	4	5	6	7	8
Basic Items								
Running Mode	Forward Only with Brake	Forward and Reverse with Brake						
Drag Force Braking	0%	5%	10%	15%	20%	25%	30%	40%
Low Voltage (Cutt-Off Threshold)	None	2.6v / Cell	2.8v / Cell	3v / Cell	3.2v / Cell	3.4v / Cell		
Start Mode	Soft	Normal	Aggressive	Very Aggressive				
Advance Items								
Maximum Brake Force	25%	50%	75%	100%				
Maximum Reverse Force	25%	50%	75%	100%				
Initial Brake Force	= Drag Force Braking	0%	20%	40%				
Neutral Range	6%	9%	12%					
Timing	0°	3.75°	7.50°	11.25°	15°	18.75°	22.50°	26.25°
Motor Type	Brushless							
Over-heat Protection	95℃	None						

User Manual Scion Series Brushless Speed Controllers

Programmable Values

1. **Running Mode:** With “Forward with Brake” mode, the car can go forward and brake, but cannot go into reverse, this mode is suitable for competition; “Forward/Reverse with Brake” mode provides backward function, which is suitable for training.

Note: “Forward/Reverse with Brake” mode uses “Double-Click” method to make the car go into reverse.

When you move the throttle stick from forward to reverse when in forward mode for the first time, the ESC sees he reverse function as brake and slows the motor down. Once the motor has stopped and the Reverse is applied again (The 2nd “click”) then and only the Reverse function is applied by the ESC.

This “Double-Click” method does prevent the model going into reverse as the brake function is frequently used.

2. **Drag Brake Force**: Set the amount of drag brake applied at neutral throttle to simulate the slight braking effect of a neutral brushed motor while coasting.

3. **Low Voltage Cut-Off:** The function is mainly to prevent the lithium battery pack from over discharging. When using a lithium battery pack, please set the suitable value for low-voltage protection as your like.

WARNING: Never use the default value “Non-protection” for lithium battery! The ESC monitors the battery’s voltage at any time, if the voltage is lower than the threshold, the output power will be cut off.

4. **Start Mode** (Also called “Punch”): Select from “soft” to “very aggressive” start mode as your like. Please note that if you choose “Aggressive” or “Very Aggressive” mode, you’d better use good quality battery pack with powerful discharge ability, otherwise these 2 modes cannot get the bursting start effect as you want. If the motor cannot run smoothly (the motor is trembling), it may caused by the weak discharge ability of the battery pack, please choose a better battery or increase the gear rate.

5. **Maximum Brake Force:** The ESC provides proportional brake function. The brake force is related to the position of the throttle stick. Maximum brake force refers to the force when the throttle stick is located at the top point of the reverse. A very large brake force can shorten the brake time, but it may damage the gears.

6. **Maximum Reverse Force**: Sets how much power will be applied in the reverse direction. Different value makes different reverse speed.

7. Initial Brake Force: It is also called “minimum brake force”, and it refers to the force when the throttle stick is located at the initial position of the reverse. The default value is equal to the drag brake force, so the brake effect can be very smooth.

8. **Throttle Neutral Range**: Please see the following illustrations to adjust the neutral range as your like.

9. **Timing:** There are many differences among structures and parameters of different brushless motors, so a fixed timing ESC is difficult to compatible with all brushless motors. It is necessary to make the timing value programmable.

Please select the most suitable timing value according to the motor you are just using. Generally, higher timing value brings out higher power output, but the whole efficiency of the system will be slightly lower down.

10. **Motor Type:** There is only one value (“Brushless motor”) for this item, so it is needn’t to be changed.

11. **Over-Heat Protection:** If the function is activated, the output power will be cut-off when the temperature of the ESC is up to 95 Celsius degrees for more than 5 seconds. When the protection happens, the Green LED will flash in such a way: “Flashes-----Flashes-----Flashes-----”

Reset All Items to Default

At any time when the throttle is in neutral position (except in the throttle calibration or parameters program process), hold the “SET” key for over 3 seconds, the red LED and green LED will flash at the same time, which means each programmable item has be reset to its default value.

Programming card

Programming card is an optional accessory, which can be purchased separately. It has a friendly user interface. The process of programming the ESC becomes quite easy and fast with this pocket sized device. When the programmable value needs to be changed, please just plug the control wires of the ESC (trio wires with black, red and white colour) into the socket of the program card, and then connect the main battery pack to the ESC, each item’s value will be shown on the program card. Use “ITEM” and “VALUE” buttons to select the programmable items and new values, and then press “OK” button to store the new settings into the ESC.